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Soleella mirabilis sp. nov. on *Saccharum arundinaceum* from China

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Abstract—A new species, *Soleella mirabilis*, on leaves of *Saccharum arundinaceum* from China, differs from all other species of *Soleella* mainly by its consistently trifusiform ascospores deeply constricted at the isthmuses. A technical description, comments, and illustrations of this fungus are provided. The type specimen is deposited in the Reference Collection of Forest Fungi of Anhui Agricultural University, China (AAUF).

Key words—morphology, *Poaceae, Rhytismataceae, Rhytismatales,* taxonomy

Introduction

The genus *Saccharum* L., which includes some of the most important crop plants in the world, has been extensively studied for its associated fungi. There are, however, very few records of members of the *Rhytismatales* associated with these plants. Only three species have been reported: *Terriera sacchari* (Lyon) P.R. Johnst., *Lophodermium arundinaceum* (Schrad.) Chevall., and *L. saccharicola* S.J. Wang & Y.R. Lin (Johnston 2001, Lin & al. 2012, Wang & al. 2012, Farr & Rossman 2018). In the present paper, we describe a new

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species of the *Rhytismataceae* on dead leaves of *Saccharum arundinaceum* from Anhui and Jiangxi Provinces, China.

Materials & methods

Mature fruit bodies were selected from collected specimens. Macroscopic observations were made of dried material using a dissecting microscope at 10–50× magnification. The material was then rehydrated in water for c. 15 min., and 8–15 µm thick vertical sections of the fruit bodies were sliced using a freezing microtome or razor blades by hand. Sections were mounted in water or 0.1% (w/v) cotton blue in water for the observations of ascomatal and conidiomatal outlines in vertical section. Gelatinous sheaths surrounding ascospores and paraphyses were examined in water. The colours of internal structures and ascospore contents were observed in water. Measurements and drawings were made using materials mounted in water from c. 30 asci, ascospores, and paraphyses per specimen. Point and line integrated illustration of internal structures of fruit bodies were drawn using the microscopic painting device. The holotype specimen is deposited in the Reference Collection of Forest Fungi of Anhui Agricultural University, China (AAUF).

Taxonomy

Soleella mirabilis S.J. Wang & Y.R. Lin, **sp. nov.** FIGS 1, 2

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Differs from *Soleella chinensis*, *S. huangshanensis*, and *S. pinicola* by its occurrence on a poaceous host, its subepidermal ascomata, and its consistently trifusiform ascospores deeply constricted at the isthmuses.

TYPE: On dead leaves of *Saccharum arundinaceum* Retz. (*Poaceae*): China, Anhui, Huangshan Arboretum, alt. c. 550 m, 25 September 2004, S.J. Wang & Y.R. Lin 1924b (**Holotype**, AAUF 68032b).

ETYMOLOGY: The specific epithet refers to the extraordinary shape of the ascospores.

COLONIES on both sides of leaves, forming irregular grey-yellow to pale brown bleached spots that sometimes coalesce into larger bleached spots.

ZONE LINES frequent, grey-brown or black, thin, entirely or partly surrounding the bleached spots.

CONIDIOMATA developing on both sides of leaves, scattered, occasionally several coalescent. In surface view, conidiomata 140–270 × 70–130 µm, oblong, rounded or slightly irregular, brown to black-brown, opening by one to several ostioles. In vertical section conidiomata intraepidermal, more or less double lens-shaped. Upper wall and basal wall poorly developed. Conidia not observed.

ASCOMATA in similar positions to conidiomata on the host, mostly parallel to the host veins, scattered, rarely 2–3 ascomata confluent, in pale brown

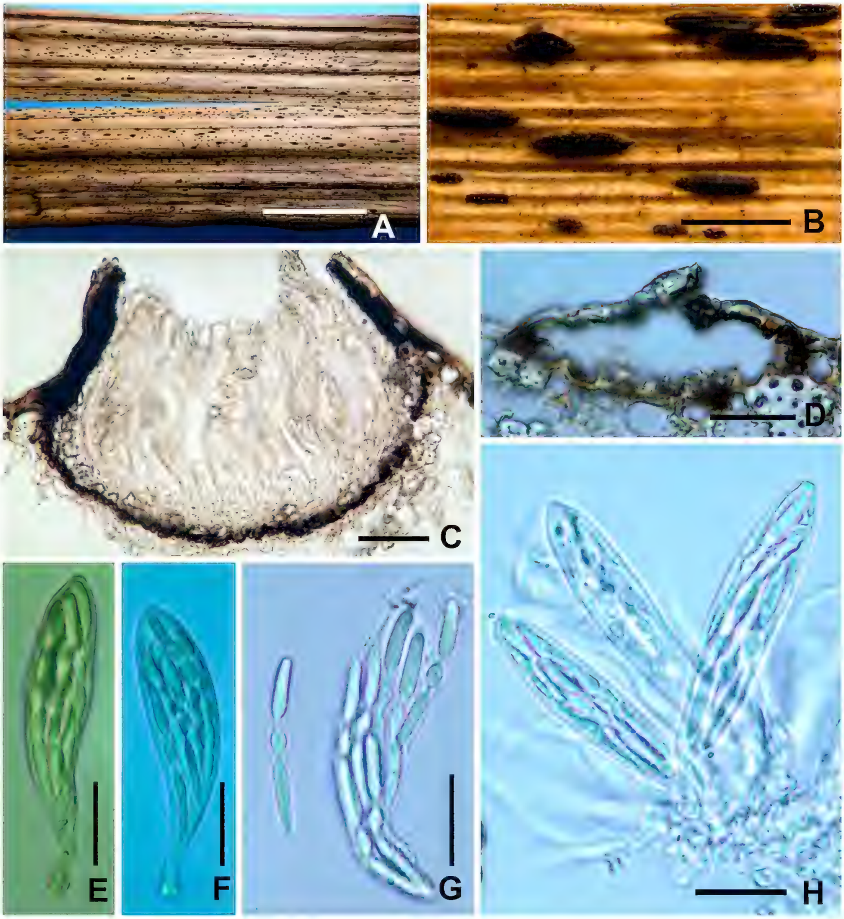

Fig. 1. *Soleella mirabilis* (holotype, AAUF 68032b) on *Saccharum arundinaceum*: A. Habit on a leaf; B. Conidiomata and ascomata observed under a dissecting microscope; C. Ascoma in median vertical section; D. Conidioma in median vertical section; E, F. Asci; G. Ascospores; H. Asci and paraphyses. Scale bars: A = 10 mm; B = 1 mm; C = 50 μm; D = 30 μm; E– H = 20 μm.

bleached areas and associated with zone lines. In surface view, ascomata 570–1150 × 180–250 μm, elliptical, long elliptical, or oblong-elliptical, grey-black or dark brown, sometimes with a light surrounding area and a dark brown perimeter line, shiny, ends acute, round or obtuse, moderately rising above the surface of the substratum and opening by a single longitudinal split running the entire length of the ascoma. Lips absent, but with pale preformed opening mechanism. In median vertical section, ascomata subepidermal. COVERING STROMA 18–25 µm thick near the centre of the ascoma, extending to the basal stroma, consisting of an outer layer of host cuticle and an inner layer of textura angularis with dark brown, thick-walled cells 3–7 µm diam. Lips cells absent, but some thin-walled, hyaline, small angular cells visible near the opening. BASAL STROMA poorly developed, slightly concave to flat, 3–11(–18) µm thick, composed of 1–2 rows of dark brown, thick-walled angular cells 5–9 µm diam. SUBHYMENIUM 16–23 µm thick, textura porrecta to angularis. Paraphyses 10–25 µm longer than asci, filiform, septate, not branched, not (or only slightly) swollen or slightly swollen at the apex, with a c. 1 µm thick gelatinous sheath. ASCI ripening sequentially, (60–)75–110 × (13–)15–19 µm, broad clavate to saccate, stalk 10–25 µm long, thin-walled, apex rounded or rarely subtruncate, J–, without circumapical thickening, 8-spored, discharging spores though a single apical pore. ASCOSPORES (32–)38–42 × (2–)3–4.5 µm, consistently trifusiform, upper part cylindrical, middle part elliptical or sub-rounded and lower part slightly clavate, rounded at the apex and subacute or rounded at the base, hyaline, aseptate, deeply constricted at the isthmuses, in the thinnest part <1 µm diam, with a 1–1.5 µm thick gelatinous sheath.

HOST SPECIES, HABITAT, DISTRIBUTION: On *Saccharum arundinaceum*, producing conidiomata and ascomata on dead leaves. Known from Anhui and Jiangxi Provinces, China.

ADDITIONAL SPECIMENS EXAMINED: On *Saccharum arundinaceum*: **CHINA**, **ANHUI**, **Tiantangzhai**, alt. c. 900 m, 17 Sep. 2005, Y.R. Lin & S.J. Wang 2025 (AAUF 68133); **Shitai County**, Dayan, alt. c. 200 m, 1 Jul. 2006, S.J. Wang & T. Zhang 2092 (AAUF 68200); **Huangshan Arboretum**, alt. c. 550 m, 11 Sep. 2007, Y.R. Lin, S.J. Wang & L. Chen 2232a (AAUF 68340a); **Wanfoshan**, alt. c. 950 m, 22 Aug. 2008, Y.R. Lin & S.J. Wang 2343 (AAUF 68451); **JIANGXI**, **Mount Sanqingshan National Park**, Daye Forest Farm, alt. c. 600 m, 20 Aug. 2012, Y.R. Lin, S.J. Wang & F. Zhou 2650 (AAUF 68758).

COMMENTS—Within *Soleella*, *S. mirabilis* is exceptional because of its consistently trifusiform ascospores deeply constricted at the isthmuses. Within *Rhytismatales*, some species of *Bifusella* and *Soleella* have similarly shaped ascospores (Darker 1967, Lin 1994, Lin & al. 2012). *Bifusella* species have subcuticular ascomata, and *Soleella* species have intraepidermal to partly subhypodermal ascomata; we therefore place our new species in *Soleella*. *Soleella* was established by Darker (1967) and includes six currently accepted species (Index Fungorum 2018), all exclusively on conifer needles and including important plant pathogens, e.g., *S. chinensis* causing serious needle-cast or dieback (Darker 1967, Lin & al. 2012). However, our new species, *S. mirabilis*, has a poaceous host.

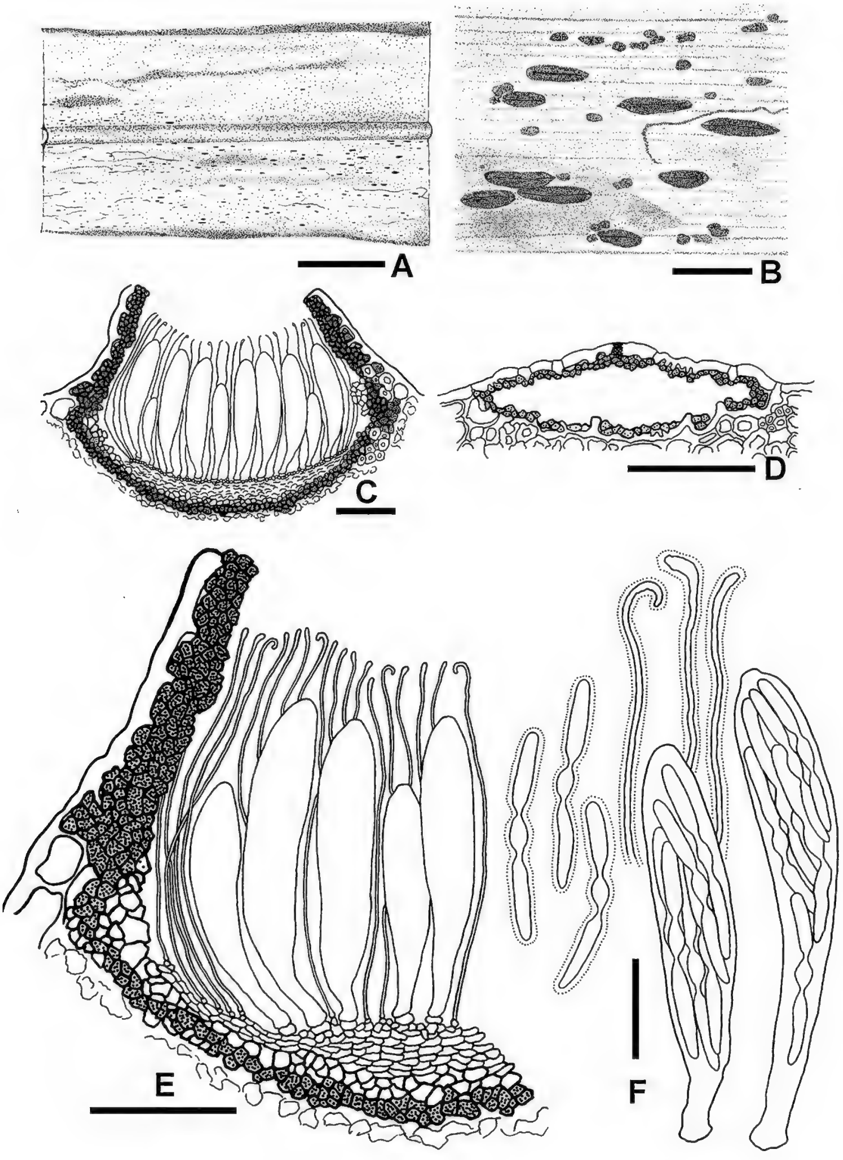

FIG. 2. *Soleella mirabilis* (holotype, AAUF 68032b) on *Saccharum arundinaceum*: A. Habit on a leaf; B. Conidiomata, ascomata, and a zone line observed under a dissecting microscope; C. Ascoma in median vertical section; D. Conidioma in median vertical section; E. Portion of ascoma in median vertical section; F. Paraphyses, asci and ascospores. Scale bars: A = 10 mm; B = 1 mm; C– E = 50 μm; F = 20 μm.

Soleella chinensis Y.R. Lin & al., *S. huangshanensis* C.L. Hou & H.S. Cao, and *S. pinicola* Y.R. Lin & W. Ren also produce trifusiform ascospores, but only rarely; they produce mostly bifusiform ascospores that are only slightly constricted at the isthmuses (Lin & Ren 1992; Lin & al. 1995, 2012, Hou & al. 1997).

Our new species is distributed widely throughout central and eastern China (Jiangxi and Anhui Provinces). Sizes of ascomata, asci, and ascospores varied among different collections, being larger in specimens on flourishing host plants, and smaller on thin and weak hosts. We infer that nutritional status of substrate influences the development of the specimens. We tried unsuccessfully to extract genomic DNA for further analysis.

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Literature cited

Darker GD. 1967. A revision of the genera of the *Hypodermataceae*. Canadian Journal of Botany 45(8): 1399–1444. https://doi.org/10.1139/b67-145

Farr DF, Rossman AY. 2018. Fungal databases, Systematic Mycology and Microbiology Laboratory. ARS, USDA. https://nt.ars-grin.gov/fungaldatabases/fungushost/fungushost.cfm [viewed online on 19 April 2018]

Hou CL, Cao HS, Wu WJ, Wang JR, Wang ZC. 1997. A new species of *Soleella* on *Tsuga tchekiangensis* [in Chinese]. Mycosystema 16(1): 14–16. https://doi.org/10.13346/j.mycosystema.1997.01.004

Index Fungorum. 2018. [www.indexfungorum.org (viewed online on 17 Aprl 2018)].

Johnston PR. 2001. Monograph of the monocotyledon-inhabiting species of *Lophodermium*. Mycological Papers 176. 239 p.

Lin YR. 1994. A new species of *Bifusella* (*Rhytismataceae*, *Ascomycota*). Mycosystema 7(1): 19–21.

Lin YR, Ren W. 1992. A new species of the *Rhytismataceae*, *Soleella pinicola* sp. nov. [in Chinese]. Acta Mycologica Sinica 11(3): 210–212. https://doi.org/10.13346/j.mycosystema.1992.03.007

Lin YR, Liu HY, Li Z, Liang SW, Yu SM, Wang LB. 1995. A new species of *Soleella* on *Pinus taiwanensis* [in Chinese]. Forest Research 8(4): 422–425. https://doi.org/10.13275/j.cnki.lykxyj.1995.04.014

Lin YR, Liu HY, Hou CL, Wang SJ, Ye M, Huang CL, Xiang Y, Yu SM. 2012. Flora fungorum sinicorum, vol. 40, *Rhytismatales* [in Chinese]. Science Press, Beijing. 261 p.

Wang SJ, Minter DW, Gao XM, Lin YR. 2012. A new species of *Lophodermium* on *Saccharum arundinaceum* (in Chinese). Mycosystema 31(4): 471–475. https://doi.org/10.13346/j.mycosystema.2012.04.002